

Roll No.:


Test Date: 22/01/2017

Centre Code:

Test Booklet Code **C**

## TEST No.5

# ALL INDIA AAKASH TEST SERIES



## for MEDICAL Entrance Exams - 2018

National Eligibility-cum-Entrance Test (NEET)

### INSTRUCTIONS FOR CANDIDATES

1. Read each question carefully.
2. It is mandatory to use Blue/Black Ball Point Pen to darken the appropriate circle in the answer sheet.
3. Mark should be dark and should completely fill the circle.
4. Rough work must not be done on the answer sheet.
5. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked.
6. Student cannot use log tables and calculators or any other material in the examination hall.
7. Before attempting the question paper, student should ensure that the test paper contains all pages and no page is missing.
8. Each correct answer carries four marks. One mark will be deducted for each incorrect answer from the total score.
9. Before handing over the answer sheet to the invigilator, candidate should check that Roll No. and Centre Code have been filled and marked correctly.
10. Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.

Note: It is compulsory to fill Roll No. and Test Booklet Code on answer sheet, otherwise your answer sheet will be rejected.



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Time : 3 Hrs.

**TEST - 5**

MM : 720

**[PHYSICS]**

Choose the correct answer :

- The density of a newly discovered planet is twice that of earth. The acceleration due to gravity at surface of planet is half of the acceleration at surface of earth, if radius of the earth is  $R$ . The radius of planet would be
  - $2R$
  - $4R$
  - $\frac{R}{4}$
  - $\frac{R}{8}$
- Two bodies of masses  $m$  and  $4m$  are placed at a distance  $r$ . The gravitational potential at a point due to mass  $m$  on the line joining where gravitational field is zero
  - Zero
  - $-\frac{3Gm}{r}$
  - $-\frac{3Gm}{2r}$
  - $-\frac{2Gm}{r}$
- If earth is revolving in elliptical orbit around sun, then which of the following quantity remains constant w.r.t. sun?
  - Linear speed
  - Kinetic energy
  - Angular speed
  - Angular momentum
- A projectile is projected with velocity  $\frac{2}{3}v_e$  in vertically upward direction from ground into space, then height covered (  $R$  = Radius of earth )
  - $\frac{9}{5}R$
  - $\frac{4}{5}R$
  - $\frac{R}{5}$
  - $\frac{2R}{5}$
- Object feel weightlessness at equator of earth when angular speed becomes
  - 5 times
  - 15 times
  - 17 times
  - 25 times
- A rocket is fired with a speed  $v = 2\sqrt{gR}$  near the earth's surface and directed upward, what is interstellar speed of rocket ( $v'$ ), where  $v_e$  escape speed on the surface of earth
  - $v' < v_e$
  - $v' > v_e$
  - $v' = v_e$
  - $v' = \sqrt{2}v_e$
- If a planet is revolving around sun in circular orbit with force  $F \propto r^{-5/2}$ , where  $r$  is radius, then square of the period is proportional to
  - $r^{5/2}$
  - $r^{7/2}$
  - $r^{7/2}$
  - $r^{3/2}$
- For a satellite moving in a circular orbit around the earth, the ratio of its total mechanical energy to kinetic energy
  - 1
  - 1
  - 2
  - 2
- The gravitational field intensity at a point  $10 \times 10^3$  km from the centre of the earth is  $4.8 \text{ N kg}^{-1}$ . The gravitational potential at that point is
  - $-4.8 \times 10^7 \text{ J kg}^{-1}$
  - $-2.4 \times 10^7 \text{ J kg}^{-1}$
  - $4.8 \times 10^6 \text{ J kg}^{-1}$
  - $3.6 \times 10^6 \text{ J kg}^{-1}$

Space for Rough Work

Handwritten rough work for Question 1:

Planet:  $\rho = 2\rho_e$ ,  $g = \frac{1}{2}g_e$

Earth:  $\rho_e$ ,  $g_e$

Radius of planet:  $R_p$

Radius of earth:  $R_e$

Equation:  $\frac{4}{3}\pi R_p^3 \cdot 2\rho_e = \frac{4}{3}\pi R_e^3 \cdot \rho_e$

Solving for  $R_p$ :  $R_p^3 = \frac{1}{2}R_e^3$

$R_p = \frac{R_e}{\sqrt[3]{2}}$

Equation:  $g = \frac{GM}{R^2}$

For planet:  $\frac{1}{2}g_e = \frac{G \cdot 2M_e}{R_p^2}$

For earth:  $g_e = \frac{GM_e}{R_e^2}$

Dividing:  $\frac{1}{2} = \frac{2R_e^2}{R_p^2}$

$R_p^2 = 4R_e^2$

$R_p = 2R_e$

Handwritten rough work for Question 9:

Gravitational field intensity  $E = 4.8 \text{ N kg}^{-1}$

Distance  $r = 10 \times 10^3 \text{ km} = 10^7 \text{ m}$

Equation:  $E = \frac{GM}{r^2}$

$4.8 = \frac{GM}{(10^7)^2}$

$GM = 4.8 \times 10^{14}$

Equation:  $\phi = -\frac{GM}{r}$

$\phi = -\frac{4.8 \times 10^{14}}{10^7}$

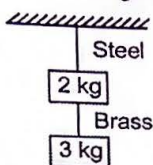
$\phi = -4.8 \times 10^7 \text{ J kg}^{-1}$

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10. If the ratio of diameter, lengths and Young's moduli of steel and brass wires shown in figure are 2 : 1, 2 : 1 and 2 : 1 respectively, then the corresponding ratio of increase in their lengths would be



- (1)  $\frac{5}{12}$  (2)  $\frac{12}{5}$   
(3)  $\frac{4}{5}$  (4)  $\frac{5}{4}$

11. The bulk modulus of water if its volume changes from 100 litre to 99.5 litre under a pressure of 100 atm is (1 atm =  $10^5$  N/m<sup>2</sup>)

- (1)  $3 \times 10^9$  N/m<sup>2</sup>  
(2)  $2 \times 10^9$  N/m<sup>2</sup>  
(3)  $2 \times 10^8$  N/m<sup>2</sup>  
(4)  $4 \times 10^9$  N/m<sup>2</sup>

12. A wire of length  $l$  has a linear mass density  $\lambda$  and area of cross-section  $A$  and the Young's modulus  $y$  is suspended vertically from rigid support. The extension produced in wire due to its own weight

- (1)  $\frac{\lambda g l^2}{yA}$  (2)  $\frac{\lambda g l^2}{2yA}$   
(3)  $\frac{2\lambda g l^2}{yA}$  (4)  $\frac{2\lambda g l^2}{3yA}$

13. For a given material, the Young's modulus is 2.4 times of modulus of rigidity, its Poisson's ratio is

- (1) 2.4  
(2) 0.4  
(3) 0.2  
(4) 0.1

14. A steel wire of length  $2L$  and cross-section area  $A$  is stretched, well within elastic limit horizontally between two pillars, a mass  $m$  is suspended from the mid-point of wire such that depression at the middle is  $x$ . Strain in the wire is proportional to

- (1)  $\frac{x^2}{L^2}$  (2)  $\frac{x}{L^2}$   
(3)  $\frac{x^2}{L}$  (4)  $\frac{x}{L}$

15. To what height should a cylindrical vessel be filled with a homogenous liquid to make the force on bottom equal to force on side? ( $R$  = radius of vessel)

- (1)  $2R$  (2)  $R$   
(3)  $\frac{R}{2}$  (4)  $4R$

16. The cylindrical tube of a spray pump has a cross-section of  $6 \text{ cm}^2$  one of which has 50 holes each of diameter 1 mm. If the liquid flow inside the tube is 1.2 m/min, then speed of ejection of the liquid through the holes is

- (1) 2.1 m/s (2) 0.31 m/s  
(3) 0.96 m/s (4) 3.4 m/s

17. Which of the following device is used to measure the rate of flow of liquid through a pipe?

- (1) Thermometer (2) Barometer  
(3) Manometer (4) Venturimeter

18. If liquid of density  $\rho$  is filled in an open cylindrical container to height  $h$ , then pressure at bottom

- (1)  $> h\rho g$  (2)  $< h\rho g$   
(3)  $= h\rho g$  (4)  $\frac{h\rho g}{2}$

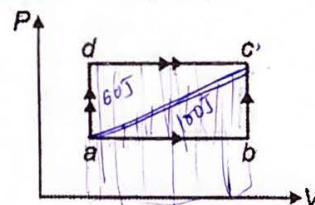
19. A solid sphere falls with a terminal velocity  $v$  in air, if it is allowed to fall in vacuum. Its terminal speed

- (1)  $v$  (2)  $> v$   
(3)  $< v$  (4) Is not defined

Space for Rough Work



20. Eight drops of equal radius are falling with terminal speed 9 cm/s. If they coalesce to form a single drop, then new terminal speed  
 (1) 36 cm/s (2) 32 cm/s  
 (3) 27 cm/s (4) 18 cm/s
21. When a drop of water splits up into number of droplets, then which of the following is correct?  
 (1) Area increases (2) Energy is absorbed  
 (3) Volume is constant (4) All of these
22. The moment of inertia of a rod about its perpendicular bisector is  $I$ , when temperature of rod is increased by  $\Delta T$ , the increase in the moment of inertia of the rod about same axis ( $\gamma$  = temperature coefficient of volume expansion)  
 (1)  $\gamma \Delta T$  (2)  $\frac{2\gamma}{3} \Delta T$   
 (3)  $\frac{5\gamma}{3} \Delta T$  (4)  $\frac{\gamma \Delta T}{2}$
23. A uniform iron wire of cross-section area  $0.20 \times 10^{-6} \text{ m}^2$  is held fixed in between fixed supports. If wire cooled from  $100^\circ\text{C}$  to  $0^\circ\text{C}$ , then force of 48 N is exerted on supports by ends, then expansion coefficient of wire (Young's modulus =  $2 \times 10^{11} \text{ N/m}^2$ )  
 (1)  $1.2 \times 10^{-5}/^\circ\text{C}$  (2)  $2.4 \times 10^{-5}/^\circ\text{C}$   
 (3)  $0.6 \times 10^{-5}/^\circ\text{C}$  (4)  $0.3 \times 10^{-5}/^\circ\text{C}$
24. A pendulum clock gives correct time at  $20^\circ\text{C}$ . How many seconds will it lose per day at  $40^\circ\text{C}$ ? ( $\alpha = 5 \times 10^{-6}/^\circ\text{C}$ )  
 (1) 3.2 s (2) 4.32 s  
 (3) 2.16 s (4) 1.6 s
25. When water is heated from  $0^\circ\text{C}$  to  $100^\circ\text{C}$ , its density  
 (1) Decreases  
 (2) Increases  
 (3) First increases and then decreases  
 (4) First decreases and then increases
26. A 5 g piece of ice at  $-20^\circ\text{C}$  is put into 10 g of water at  $30^\circ\text{C}$ . The final temperature of mixture is  
 (1)  $0^\circ\text{C}$  (2)  $10^\circ\text{C}$   
 (3)  $20^\circ\text{C}$  (4)  $50^\circ\text{C}$
27. Boiling water is changing into steam. Under this condition, the specific heat of water is  
 (1) Zero (2) One  
 (3) Infinite (4) All of these
28. Two liquids at different temperature are mixed in a calorimeter of zero thermal capacity. Which of the following quantity is conserved?  
 (1) Sum of the temperatures  
 (2) Internal energy of each liquid  
 (3) Total internal energy of two liquids  
 (4) All of these
29. Two moles of an ideal monatomic gas is heated at constant pressure so that its temperature increases from  $127^\circ\text{C}$  to  $227^\circ\text{C}$ , then work done by gas  
 (1) 1660 J (2) 1000 J  
 (3) 1600 J (4) 2660 J
30. When a process is taken from process  $abc$  100 J of heat is absorbed by system and 50 J of work is done by it. If work done in process  $adc$  is 60 J, then heat absorbed in this process



- (1) 200 J (2) 250 J  
 (3) 110 J (4) 90 J
31. If gas expands according to relation  $P = 4V$ , then work done in expansion  $V_0$  to  $3V_0$   
 (1)  $16V_0^2$  (2)  $48V_0^2$   
 (3)  $72V_0^2$  (4)  $18V_0^2$

Space for Rough Work

$$P = 4V$$

$$V_0 \text{ to } 3V_0$$

$$m_1 C_1 (\Delta T_1 - \Delta T) = m_2 C_2 (\Delta T - T_2)$$

$$PV = nRT$$

$$P \times (V_0 + 3V_0) = 4V_0 \times 4V_0$$

$$\frac{20 - T}{T - 30} = \frac{42}{400}$$

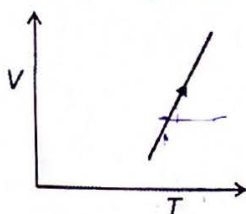
$$8000 - 400T = 42T - 1360$$

$$442T = 9360$$

$$T =$$

$$442T = 9360$$

32. From given V-T diagram, pressure of gas



- (1) First increases then decreases  
 (2) Pressure decreasing  
 (3) Pressure increasing  
 (4) Pressure is constant
33. A sample of ideal gas ( $\gamma = 1.4$ ) is heated at constant pressure. If an amount of 140 J heat is supplied to the gas, then change in internal energy of the gas
- (1) 40 J (2) 120 J  
 (3) 100 J (4) 50 J
34. A monoatomic gas is compressed adiabatically to  $\frac{8}{27}$  of its initial volume, if initial temperature is  $27^\circ\text{C}$ , then increase in temperature
- (1)  $375^\circ\text{C}$  (2)  $275^\circ\text{C}$   
 (3)  $475^\circ\text{C}$  (4)  $175^\circ\text{C}$
35. A Carnot engine takes  $10^6$  cal of heat from a reservoir at  $627^\circ\text{C}$  and exhaust it to sink at  $27^\circ\text{C}$ . How much work does it perform?
- (1)  $4.2 \times 10^6$  J (2)  $8.4 \times 10^6$  J  
 (3)  $2.8 \times 10^6$  J (4)  $2.4 \times 10^6$  J
36. P-V diagram of a monoatomic gas is a straight line passing through origin. The molar heat capacity of gas in the process will be
- (1)  $4R$  (2)  $2R$   
 (3)  $5R$  (4)  $\frac{5}{3}R$

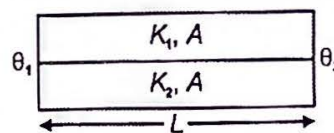
37. A gas undergoes a process in which its pressure  $P$  and volume  $V$  are related as  $VP^r = \text{constant}$ . The bulk modulus of gas for this process

- (1)  $rP$  (2)  $P^{1/r}$   
 (3)  $\frac{P}{r}$  (4)  $r^2P$

38. Two gases ' $\text{O}_2$ ' and ' $\text{He}$ ' expand for same volume difference at constant and equal pressure, then

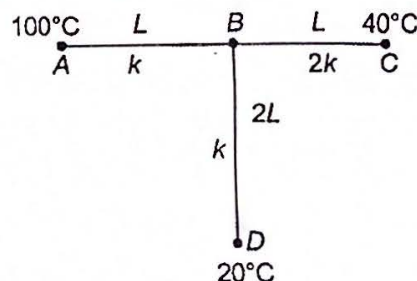
- (1)  $w_{\text{O}_2} > w_{\text{He}}$  (2)  $w_{\text{He}} > w_{\text{O}_2}$   
 (3) Equal work (4) All of these

39. Two bar of identical dimensions are kept as shown in figure. If  $K_1$  and  $K_2$  are their coefficients of thermal conductivities, then equivalent  $K$



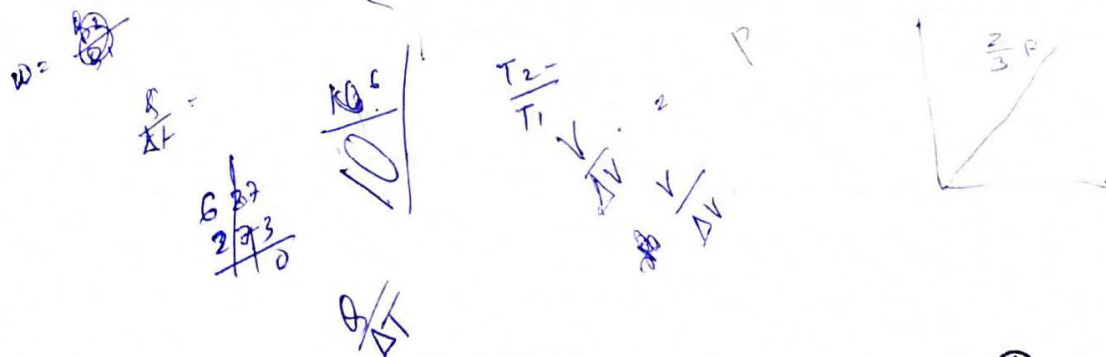
- (1)  $\frac{K_1 + K_2}{2}$  (2)  $K_1 + K_2$   
 (3)  $\frac{K_1 K_2}{K_1 + K_2}$  (4)  $\frac{2K_1 K_2}{K_1 + K_2}$

40. Find the temperature of junction at B, if each rod has equal area of cross-section.



- (1)  $\frac{90}{7}^\circ\text{C}$  (2)  $\frac{50}{7}^\circ\text{C}$   
 (3)  $\frac{380}{7}^\circ\text{C}$  (4)  $\frac{280}{5}^\circ\text{C}$

Space for Rough Work





41. The temperature of a body falls from  $40^{\circ}\text{C}$  to  $30^{\circ}\text{C}$  in 10 minutes. If temperature of surrounding is  $15^{\circ}\text{C}$ , then time to fall the temperature from  $30^{\circ}$  to  $20^{\circ}\text{C}$
- (1) 15 min (2) 8 min  
(3) 20 min (4) 14 min
42. In heat transfer, which method is based on gravitation?
- (1) Convection (2) Conduction  
(3) Radiation (4) All of these
43. A black body has maximum wavelength  $\lambda_m$  at temperature 2000 K, its corresponding wavelength at 3000 K will be
- (1)  $\frac{3}{2}\lambda_m$  (2)  $\frac{2}{3}\lambda_m$   
(3)  $\frac{4}{9}\lambda_m$  (4)  $\frac{9}{4}\lambda_m$
44. A hot body will radiate maximum energy if its surface is
- (1) White and polished  
(2) Silver polished  
(3) White and rough  
(4) Black and rough
45. On the opposite sides of vertical vessel filled with water, two identical holes are opened. If area of cross-section for each is  $a$  and difference of height of these two is  $h$  and  $\rho$  is density of water, then force on the vessel is
- (1)  $apgh$   
(2)  $2apgh$   
(3)  $\frac{apgh}{2}$   
(4)  $3apgh$

## [CHEMISTRY]

46. Choose the non-redox reaction.
- (1)  $2\text{KClO}_3(\text{s}) \xrightarrow{\Delta} 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$   
(2)  $\text{CuO}(\text{s}) + \text{H}_2(\text{g}) \longrightarrow \text{Cu}(\text{s}) + \text{H}_2\text{O}(\text{l})$   
(3)  $\text{H}_2\text{O}_2(\text{l}) \longrightarrow \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$   
(4)  $\text{CaCO}_3(\text{s}) \xrightarrow{\Delta} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
47. Consider the following reactions.
- I.  $2\text{PbO} + 4\text{HCl} \longrightarrow 2\text{PbCl}_2 + 2\text{H}_2\text{O}$   
II.  $\text{PbO}_2 + 4\text{HCl} \longrightarrow \text{PbCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$
- Choose the correct statement.
- (1) Both I & II are redox reactions  
(2) PbO is oxidising agent in I  
(3) PbO<sub>2</sub> is reducing agent in II  
(4) II is a redox reaction, but I is acid-base reaction
48. In which of the following compounds, an element exhibits two different oxidation states?
- (1)  $\text{H}_2\text{SO}_5$   
(2)  $\text{H}_2\text{S}_2\text{O}_3$   
(3)  $\text{CaOCl}_2$   
(4) All of these
49. Which of the following arrangement represents increasing oxidation number of the central atom?
- (1)  $\text{N}_2\text{O}, \text{NO}_2, \text{N}_2\text{O}_3, \text{N}_2\text{O}_5$   
(2)  $\text{MnO}, \text{MnO}_2, \text{MnO}_4^-, \text{MnO}_4^{2-}$   
(3)  $\text{CrO}_2^-, \text{ClO}_3^-, \text{CrO}_4^{2-}, \text{MnO}_4^-$   
(4)  $\text{CO}, \text{CO}_2, \text{CO}_3^{2-}, \text{C}_3\text{O}_2$

Space for Rough Work

$$\Delta T = 40^{\circ}\text{C}$$

$$t = 10 \text{ minutes.}$$

A ~~met~~ ~~met~~Bulk Modules  
Formula?

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50. Identify the disproportionation reaction.
- (1)  $2\text{KClO}_3 \xrightarrow{\Delta} 2\text{KCl} + 3\text{O}_2$   
 (2)  $\text{P}_4 + 3\text{OH}^- + 3\text{H}_2\text{O} \longrightarrow \text{PH}_3 + 3\text{H}_2\text{PO}_2^-$   
 (3)  $\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$   
 (4)  $4\text{FeS}_2 + 11\text{O}_2 \longrightarrow 2\text{Fe}_2\text{O}_3 + 8\text{SO}_2$
51. Consider the following statements :
- I. Among halogens, fluorine is the best oxidant.  
 II. Fluorine does not show disproportionation reaction in normal conditions  
 III.  $\text{MnO}_4^{2-}$  undergoes disproportionation in acidic medium but  $\text{MnO}_4^-$  does not.
- Choose the correct statement(s).
- (1) Only I & II (2) Only II  
 (3) Only II & III (4) All are correct
52. What is the average oxidation state of oxygen in  $\text{S}_2\text{O}_8^{2-}$ ?
- (1) -1.75 (2) -2.5  
 (3) -2 (4) -1
53. Given :  $E_{\text{Fe}^{3+}/\text{Fe}^{2+}}^\circ = 0.77 \text{ V}$ ;  $E_{\text{I}_2/\text{I}^-}^\circ = +0.54 \text{ V}$   
 $E_{\text{Cu}^{2+}/\text{Cu}}^\circ = +0.34 \text{ V}$ ;  $E_{\text{Ag}^+/\text{Ag}}^\circ = 0.80 \text{ V}$
- Identify the cell which will give maximum EMF°.
- (1)  $\text{Fe}^{2+}(\text{aq}) | \text{Fe}^{3+}(\text{aq}) || \text{I}^-(\text{aq}) | \text{I}_2(\text{s})$   
 (2)  $\text{Fe}^{2+}(\text{aq}) | \text{Fe}^{3+}(\text{aq}) || \text{Ag}^+(\text{aq}) | \text{Ag}(\text{s})$   
 (3)  $\text{Ag}(\text{s}) | \text{Ag}^+(\text{aq}) || \text{Cu}^{2+}(\text{aq}) | \text{Cu}(\text{s})$   
 (4)  $\text{Cu}(\text{s}) | \text{Cu}^{2+}(\text{aq}) || \text{Ag}^+(\text{aq}) | \text{Ag}(\text{s})$
54. Identify the compound in which 'S' has highest oxidation state.
- (1)  $\text{H}_2\text{SO}_5$   
 (2)  $\text{H}_2\text{S}$   
 (3)  $\text{H}_2\text{S}_4\text{O}_6$   
 (4)  $\text{SO}_2$
55. Equivalent mass of  $\text{KMnO}_4$  in acidic and basic medium respectively [M = Molar mass of  $\text{KMnO}_4$ ]
- (1)  $\frac{M}{5}, M$  (2)  $\frac{M}{5}, \frac{M}{3}$   
 (3)  $\frac{M}{3}, \frac{M}{5}$  (4)  $M, \frac{M}{2}$
56. Choose the incorrect statement.
- (1) The oxidation state of hydrogen is always +1  
 (2) The oxidation state of oxygen is always -ve  
 (3) In  $\text{C}_3\text{O}_2$ , oxygen has different oxidation states  
 (4) All are incorrect
57. Match the Column-I to Column-II
- | Column-I                  | Column-II                |
|---------------------------|--------------------------|
| a. Calgon                 | (i) Nuclear reactor      |
| b. $\text{H}_2\text{O}_2$ | (ii) Cutting and welding |
| c. $\text{D}_2\text{O}$   | (iii) Softening of water |
| d. H                      | (iv) Perhydrol           |
- (1) a(iv), b(i), c(ii), d(iii) (2) a(iii), b(i), c(iv), d(ii)  
 (3) a(iii), b(iv), c(i), d(ii) (4) a(i), b(ii), c(iii), d(iv)
58. Which of the following is electron deficient-hydride?
- (1)  $\text{NH}_3$  (2)  $\text{H}_2\text{O}$   
 (3)  $\text{BH}_3$  (4) HF
59. Consider the reactions :
- A :  $2\text{I}^- + 2\text{H}^+ + \text{H}_2\text{O}_2 \longrightarrow \text{I}_2 + 2\text{H}_2\text{O}$   
 B :  $\text{I}_2 + \text{H}_2\text{O}_2 + 2\text{OH}^- \longrightarrow 2\text{I}^- + 2\text{H}_2\text{O} + \text{O}_2$
- $\text{H}_2\text{O}_2$  is
- (1) Oxidant in A and B  
 (2) Reductant in A and B  
 (3) Oxidant in A and reductant in B  
 (4) Reductant in A and oxidant in B

Space for Rough Work



60. Group(s) of periodic table not forming hydrides is/are

- (1) 6 (2) 6, 7 & 8  
☒ (3) 7, 8 & 9 (4) 11 & 12

61. Choose the incorrect statement.

- (1) Metallic hydrides conduct heat and electricity  
☒ (2) Ionic hydrides are very good conductor of electricity in solid state  
 (3) Hydrides of group 13 acts as Lewis acids  
 (4) Hydrides of group 15 acts as Lewis bases

62. Consider the following statements.

- I. Permanent hardness of water is removed by treatment with washing soda.  
 II. Platinum and palladium can adsorb large volumes of hydrogen.  
 III. Washing soda reacts with soluble magnesium and calcium sulphate to form insoluble carbonates.

Choose the correct statement(s).

- (1) Only III (2) Only I & II  
☒ (3) Only II & III (4) I, II & III

63. Consider the following statements.

- I. 68 g  $\text{H}_2\text{O}_2$  gives 22.4 L of  $\text{O}_2(\text{g})$  at STP on complete decomposition.  
 II. 1.5 g  $\text{H}_2\text{O}_2/100 \text{ mL}$  solution will give 500 mL  $\text{O}_2(\text{g})$  at STP.  
 III. 15 g/L solution of  $\text{H}_2\text{O}_2$  is known as 5 V solution of  $\text{H}_2\text{O}_2$ .

Choose the correct statements.

- (1) Only I & II  
 (2) Only II & III  
 (3) Only I & III  
☒ (4) I, II & III

64. Permanent hardness of water is due to the presence of salts of Ca and Mg in the form of

- (1) Bicarbonates  
☒ (2) Carbonates  
☒ (3) Sulphates and chlorides  
 (4) Nitrates and carbonates

65. Which of the following statement is correct?

- (1) Hard water forms lather with soap easily  
 (2) Bond angle in water is  $109^\circ 28'$   
☒ (3) Hydrogen peroxide is stored in wax lined bottles  
☒ (4) Sulphuric acid is preferred over phosphoric acid in preparing hydrogen peroxide from peroxides

66. What is the volume of 10 volume  $\text{H}_2\text{O}_2$  solution required to react completely with 100 mL of 1 N  $\text{KMnO}_4$  solution?

- (1) 56 mL (2) 112 mL  
 (3) 224 mL (4) 448 mL

67. The chemical formula of barium peroxide is

- ☒ (1)  $\text{Ba}_2\text{O}_2$  (2)  $\text{BaO}_2$   
 (3)  $\text{Ba}_2\text{O}$  (4)  $\text{BaO}$

68.  $\text{CaSO}_4$  is also known as

- ☒ (1) Dead burnt plaster  
 (2) Plaster of paris  
 (3) Gypsum  
☒ (4) Slate

69. To increase the setting time of cement, the substance added to it, is

- ☒ (1) Gypsum  
 (2) Lime  
☒ (3) Silica  
☒ (4)  $\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

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Handwritten periodic table fragment showing elements from H to Ba, with atomic numbers 1 through 56 indicated.



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70.  $\text{BeSO}_4$  is readily soluble in water because
- (1) Be exhibits co-ordination number more than 4
  - (2) Greater hydration enthalpy of  $\text{Be}^{2+}$  overcomes the lattice enthalpy factor
  - (3) BeO is purely acidic in nature
  - (4)  $\text{BeSO}_4$  is an ionic compound with very high polarising power of Be

71. Match the Column-I with Column-II.

Column-I	Column-II
a. Na	(i) Apple green
b. Sr	(ii) Brick red
c. Ba	(iii) Yellow
d. Ca	(iv) Crimson red
(1) a(iii), b(i), c(ii), d(iv)	(2) a(i), b(iii), c(iv), d(ii)
(3) a(iii), b(iv), c(i), d(ii)	(4) a(ii), b(i), c(iv), d(iii)

72. Consider the following statements.

- $\text{Li}_2\text{CO}_3$  decomposes easily on heating.
- $\text{BeCO}_3$  is unstable to heat and decomposes to give BeO and  $\text{CO}_2$ .
- Stability of peroxide and superoxide of alkali metals decreases as we go down the group.

Choose the incorrect statement(s).

- (1) Only III
- (2) Only II
- (3) Only II & III
- (4) Only I & III

73. Which of the following compound is used to regenerate ammonia in the preparation of washing soda by Solvay process?

- (1) CaO
- (2)  $\text{Ca(OH)}_2$
- (3)  $\text{CaCO}_3$
- (4)  $\text{Ca(HCO}_3)_2$

74. Which of the following factor is the best responsible for Li to be the strongest reducing agent?

- (1) High hydration energy
- (2) High ionisation energy
- (3) Low sublimation energy
- (4) High electron affinity

75. Soda ash is

- (1)  $\text{Na}_2\text{CO}_3$
- (2) NaOH
- (3)  $\text{CaCO}_3$
- (4) KOH

76. When  $\text{CO}_2(\text{g})$  is passed to lime water, there is appearance of milkiness. Milkiness of the solution disappears on passing excess  $\text{CO}_2$  to it, due to the formation of

- (1)  $\text{Ca(OH)}_2$
- (2) CaO
- (3)  $\text{CaCO}_3$
- (4)  $\text{Ca(HCO}_3)_2$

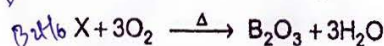
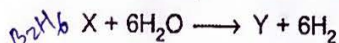
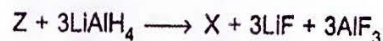
77. Hybrid state of aluminium chloride in aqueous medium is

- (1)  $sp^3$
- (2)  $sp^2$
- (3)  $d^2sp^3$
- (4)  $sp^3d$

78.  $3c - 2e^-$  bond is present in

- (1) LiH
- (2)  $\text{BeCl}_2$
- (3)  $\text{B}_2\text{H}_6$
- (4)  $\text{AlCl}_3$

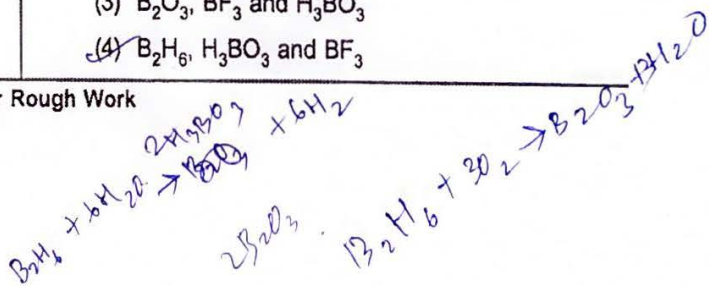
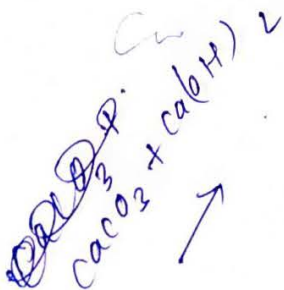
79. Consider the following reactions.



X, Y and Z respectively

- (1)  $\text{B}_2\text{H}_6$ ,  $\text{BF}_3$  and  $\text{H}_3\text{BO}_3$
- (2)  $\text{BH}_3$ ,  $\text{B}_2\text{O}_3$  and  $\text{H}_3\text{BO}_3$
- (3)  $\text{B}_2\text{O}_3$ ,  $\text{BF}_3$  and  $\text{H}_3\text{BO}_3$
- (4)  $\text{B}_2\text{H}_6$ ,  $\text{H}_3\text{BO}_3$  and  $\text{BF}_3$

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80. Consider the following statements at room temperature.

- I.  $\text{CO}_2$  is a gas while  $\text{SiO}_2$  is a solid.
- II.  $\text{SiCl}_4$  is easily hydrolysed.
- III. Boric acid shows H-bonding.

Select the correct statements.

- (1) Only I & II
- (2) Only II & III
- (3) Only I & III
- (4) I, II & III

81. Select the incorrect statement.

- (1)  $\text{Ti}(\text{NO}_3)_3$  acts as an reducing agent
- (2) Boron does not exist as  $\text{B}^{3+}$  ion
- (3)  $\text{Al}$  forms  $[\text{AlF}_6]^{3-}$  ion but boron does not form  $[\text{BF}_6]^{3-}$  ion
- (4)  $\text{Pb}^{4+}$  acts as an oxidising agent but  $\text{Sn}^{2+}$  acts as a reducing agent

82. Dry ice is

- (1)  $\text{SiO}_2$
- (2)  $\text{H}_2\text{O}(\text{s})$
- (3)  $\text{CO}_2(\text{s})$
- (4)  $\text{NH}_3(\text{s})$

83. 'Quartz' is the compound of

- (1) Al
- (2) Si
- (3) C
- (4) Pb

84.  $\text{K}_2\text{CO}_3$  cannot be prepared by Solvay process because  $\text{K}_2\text{CO}_3$  is

- (1) More soluble than  $\text{Na}_2\text{CO}_3$
- (2) Less soluble than  $\text{Li}_2\text{CO}_3$
- (3) Covalent in nature
- (4) Insoluble in water

85. Consider the following statements about Buckminster fullerene ( $\text{C}_{60}$ ).

- I. It is aromatic in nature.
- II. C is  $sp^2$ -hybridised.
- III. It has only six-membered rings.

Choose the incorrect statement(s).

- (1) Only II
- (2) Only I
- (3) Only III
- (4) Only I & III

86. The most stable thermodynamic form of carbon is

- (1) Diamond
- (2) Graphite
- (3) Bucky ball
- (4) Charcoal

87. An aqueous solution of borax is

- (1) Acidic
- (2) Basic
- (3) Amphoteric
- (4) Neutral

88. The best Lewis acid is

- (1)  $\text{BF}_3$
- (2)  $\text{BCl}_3$
- (3)  $\text{BBr}_3$
- (4)  $\text{BI}_3$

89. B - F bond length in  $\text{BF}_3$  and  $[\text{BF}_4]^-$  are respectively

- (1) 130 pm and 143 pm
- (2) 133 pm and 113 pm
- (3) 154 pm and 133 pm
- (4) 138 pm and 98 pm

90. Incorrect statement about borax is

- (1) Two boron atoms are present in  $sp^2$  hybrid state
- (2) 10 water molecules are present as water of crystallisation
- (3) Borax bead test is used for identification of d-block metal ions
- (4) Upon hydrolysis, borax produces orthoboric acid

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## [BIOLOGY]

91. Select the option which **correctly** fills up the given blanks a and b.
- (i) Leucoplasts found in the endosperm cells of castor seeds are a.
- (ii) b refers to chain of ribosome attached to mRNA in prokaryotes.
- (1) a – Aleuroplasts, b – Mesosome  
 (2) a – Amyloplasts, b – Polysome  
 (3) a – Proteioplast, b – Mesosome  
 (4) a – Elaioplasts, b – Polysome
92. The organelle that can replicate itself in S-phase of cell cycle is
- (1) Ribosome  
 (2) Chloroplast  
 (3) Centriole  
 (4) Plastid
93. How many of the given features are associated with both mitochondria and plastids?
- 70 S ribosome, Grana, Cristae, Thylakoid, Double membrane, Circular DNA
- (1) One  
 (2) Two  
 (3) Three  
 (4) Four
94. Correct sequence of layers present in the cell envelope of bacterial cell from outer to inner side is
- (1) Plasma membrane, cell wall, glycocalyx  
 (2) Glycocalyx, cell wall, plasma membrane  
 (3) Glycocalyx, plasma membrane, cell wall  
 (4) Cell wall, plasma membrane, glycocalyx
95. Which of the following is not related to the endomembrane system?
- (1) Centre of most hydrolytic enzymes  
 (2) Synthesis of lipid like steroidal hormones in animal cell  
 (3) Production of cellular energy in the form of ATP  
 (4) Can occupy up to 90% of the volume of the plant cell
96. Read the following statements :
- A. Plasma membrane is selectively permeable.  
 B. Polar molecules can pass through the lipid bilayer.
- (1) Only B is incorrect  
 (2) Only A is incorrect  
 (3) Both A and B are incorrect  
 (4) Both A and B are correct
97. Nucleolus is a prominent acidophilic spherical structure present in the nucleoplasm. It is a site for
- (1) DNA synthesis  
 (2) Lipid synthesis  
 (3) Synthesis of glycoproteins  
 (4) Active ribosomal RNA synthesis
98. Nucleus as a cell organelle was first described by
- (1) Fleming (2) Robert Koch  
 (3) Robert Brown (4) Singer and Nicolson
99. Which of the following organelles has a continuous connection with outer membrane of nucleus?
- (1) Golgi apparatus  
 (2) Lysosome  
 (3) Rough endoplasmic reticulum  
 (4) Sphaerosome

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100. Read the following statements and choose the correct option for lysosomes.

- a. Formed by the process of packaging in the golgi apparatus.
- b. Very rich in all types of hydrolytic enzymes active at basic pH.
- c. Can occupy 90% of cell volume
- d. Shows polymorphism

- (1) a & b                      (2) a & d  
(3) b & c                      (4) c & d

101. The sub-unit of prokaryotic ribosome are

- (1) 60 S + 40 S              (2) 70 S + 30 S  
(3) 60 S + 30 S              (4) 50 S + 30 S

102. Cell theory is not applicable to

- (1) Bacteria                      (2) Algae  
(3) Virus                          (4) Fungi

103. Select the non-membranous organelle from the following

- (1) Ribosome  
(2) Endoplasmic reticulum  
(3) Centriole  
(4) More than one option is correct

104. Match the column.

**Column-I**

a. Ribosome

b. Chloroplast

c. Golgi apparatus

d. Mitochondria

**Column-II**

(i) Synthesis of organic molecules

(ii) Site of aerobic respiration

(iii) Protein synthesis

(iv) Packaging of materials

- (1) a(i), b(ii), c(iii), d(iv)    (2) a(iii), b(i), c(iv), d(ii)  
(3) a(iii), b(ii), c(iv), d(i)    (4) a(iii), b(i), c(ii), d(iv)

105. Secondary cell wall of plants is

- (1) Located outside the primary wall
- (2) Located just below middle lamellae
- (3) Located inside the primary wall
- (4) Located inside the plasma membrane

106. Fine cytoplasmic connections between neighbouring cells through cell wall for cell to cell communication is called

- (1) Desmosome
- (2) Polysome
- (3) Mesosome
- (4) Plasmodesmata

107. Identify mismatch w.r.t. plastid.

- (1) Aleuroplast – Malze seed
- (2) Chromoplast – Petals
- (3) Amyloplast – Potato tuber
- (4) Chloroplast – Ripened fruit of banana

108. Mesosomes of prokaryotic cells are

- (1) Infoldings of plasma membrane with respiratory enzymes
- (2) Non-membranous vesicles which provide buoyancy
- (3) Few ribosomes attached to single mRNA
- (4) Suicidal bags of cell

109. If the centromere is situated close to its end forming one extremely short and one very long arm, the chromosome is

- (1) Telocentric
- (2) Acrocentric
- (3) Sub-metacentric
- (4) Metacentric

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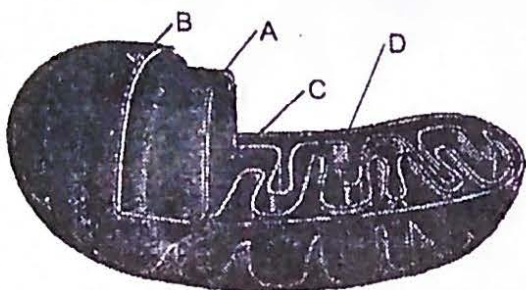


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110. The figure given below shows the structure of a mitochondria with its four parts labelled A, B, C and D. Select the part **correctly** matched with its function/features.



- (1) Part B – Outer membrane – Absence of porins  
 (2) Part A – Inner membrane – Presence of infolding toward outer chamber  
 (3) Part C – Matrix – Possesses circular DNA and 70 S ribosome  
 (4) Part D – Inter membrane space – Possesses the components required for protein synthesis
111. An elaborate network of filamentous proteinaceous structure is
- (1) Called cytoskeleton and is involved in mechanical support in bacterial cell only  
 (2) Present in the nucleoplasm and is collectively called cytoskeleton  
 (3) Present in cytoplasm of all existing living cell and is collectively called centromere  
 (4) Called cytoskeleton which is involved in motility in eukaryotes
112. The single membrane bound structure which performs photorespiration in plant cell is
- (1) Mesosome  
 (2) Peroxisome  
 (3) Glyoxisome  
 (4) Sphaerosome

113. Mark the **odd** one w.r.t. centrosome.

- (1) It usually contains two cylindrical structure called centrioles  
 (2) Centrioles in a centrosome lie parallel to each other and has an organisation like cart wheel  
 (3) It is absent in angiosperms and gymnosperms  
 (4) It gives rise to spindle apparatus during cell division in animal cells

114. Which of the following cell organelle is common for eukaryotic and prokaryotic cell?

- (1) Lysosome  
 (2) Ribosome  
 (3) Golgi complex  
 (4) Mitochondria

115. In liquid endosperm of coconut, multinucleated condition arises leading to the formation of syncytium. It is due to

- (1) Only cytokinesis  
 (2) Karyokinesis is followed by cytokinesis  
 (3) Karyokinesis is not followed by cytokinesis  
 (4) More than one option is correct

116. Select the **Incorrect** statement.

- (1) Equational division is restricted to the diploid cells only  
 (2) Cell growth results in disturbing the ratio between nucleus and cytoplasm  
 (3) Mitotic divisions result in continuous growth of plants throughout life  
 (4) A very significant contribution of equational division is cell repair

117. Which stage of prophase I is characterised by the appearance of recombination nodule?

- (1) Pachytene  
 (2) Leptotene  
 (3) Zygotene  
 (4) Diplotene

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cell repair  
"eqn".

L2TDT



118. Find out the **incorrect** match.

- (1)  $G_1$ -phase - Cell is metabolically active
- (2) S-phase - DNA synthesis takes place
- (3)  $G_2$ -phase - Synthesis of proteins
- (4)  $G_0$ -phase - Cell is metabolically inactive

119. During mitosis, ER and nucleolus begin to disappear at

- (1) Early anaphase
- (2) Early prophase
- (3) Late metaphase
- (4) Late anaphase

120. If number of chromosomes and chromatids in a root cell during metaphase is 6 and 12 respectively. Then, in anaphase, this cell possesses a chromosomes and b chromatids.

Choose the option which **correctly** fills up the given blanks a and b.

- (1) a - 6, b - 6
- (2) a - 12, b - 6
- (3) a - 6, b - 12
- (4) a - 12, b - 12

121. The term 'meiosis' was first introduced by

- (1) Strasburger
- (2) Flemming
- (3) Remak
- (4) Farmer and Moore

122. A cell has 2 picogram of DNA at  $G_1$  phase. What will be the amount of DNA, if a cell enters into quiescent phase?

- (1) 8 picogram
- (2) 4 picogram
- (3) 2 picogram
- (4) 1 picogram

123. All are mitogens, **except**

- (1) Insulin
- (2) Cytokinin
- (3) Colchicine
- (4) Auxin

124. In human cell, the interphase lasts for

- (1) 50% of the duration of cell cycle
- (2) Less than 95% of the duration of cell cycle
- (3) 24 hours
- (4) More than 95% of the duration of cell cycle

125. Which of the following stage represents transition to metaphase I?

- (1) Leptotene
- (2) Diakinesis
- (3) Diplotene
- (4) Pachytene

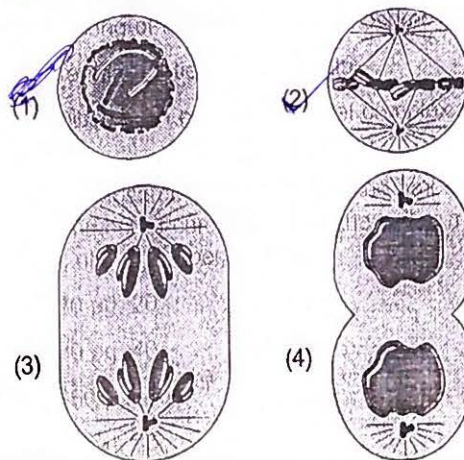
126. The beginning of diplotene is recognised by

- (1) Disappearance of nucleolus and nuclear membrane
- (2) Pairing of homologous chromosome
- (3) Terminalisation of chiasmata
- (4) Dissolution of synaptonemal complex

127. If a pollen contains 40 picograms DNA and 20 chromosome, then what was the amount of DNA and number of chromosome in the pollen mother cell at  $G_2$  phase (respectively)?

- (1) 40 pg; 20
- (2) 80 pg; 40
- (3) 160 pg; 40
- (4) 80 pg; 80

128. Given below are the diagrammatic view of stages of mitosis. In which of the following stage, morphology of chromosome is most easily studied?



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129. How many of the following events occur twice in meiosis?

Bivalent formation, Karyokinesis, Cytokinesis, DNA duplication, Centriole duplication, Condensation of chromatin, Splitting of centromere

- (1) Five (2) Three  
(3) Four (4) Six

130. What is the site of DNA and centriole duplication respectively?

- (1) Cytoplasm, nucleus  
(2) Nucleus, nucleus  
(3) Cytoplasm, cytoplasm  
(4) Nucleus, cytoplasm

131. What is the most likely pathway taken by a newly synthesized protein that will be secreted by a cell?

- (1) Golgi body → ER → Lysosome  
(2) Nucleus → ER → Lysosome  
(3) ER → Golgi body → Vesicles  
(4) Golgi body → Lysosome → ER

132. In early prophase of mitosis

- (1) Viscosity of cytoplasm increases  
(2) Shortening and condensation of chromosomal material  
(3) Centriole move towards opposite poles of cell  
(4) All of these

133. The phase of prophase I that can last for months or years in oocytes of some vertebrates is

- (1) Leptotene (2) Zygotene  
(3) Diplotene (4) Diakinesis

134. Dyad of cells is associated with

- (1) Prophase I (2) Metaphase I  
(3) Anaphase II (4) Telophase I

135. The homologous chromosomes separate, while sister chromatids remain associated at their centromere in

- (1) Anaphase I (2) Anaphase II  
(3) Metaphase I (4) Metaphase II

136. Which of the following lung volumes or capacities can be measured by spirometry?

- (1) Functional residual capacity (FRC)  
(2) Total lung capacity (TLC)  
(3) Residual volume (RV)  
(4) Vital capacity (VC)

137. The maximum volume of air a person can breathe in after a forced expiration is

- (1) Total lung capacity  
(2) Functional residual capacity  
(3) Expiratory reserve volume  
(4) Vital capacity

138. The exchange of gases between alveoli and the vascular network surrounding them is

- (1) Ventilation (2) External respiration  
(3) Internal respiration (4) Cellular respiration

139. Coarse large dust particles present in inhaled air are prevented from reaching into internal nasal cavity by

- (1) Dust cells  
(2) Ciliated epithelial lining of respiratory region  
(3) Hair in vestibular region  
(4) Both (2) & (3)

140. The laryngeal cartilages which are hyaline in nature and present on ventral surface of larynx are

- (1) Thyroid and epiglottis  
(2) Thyroid and arytenoid  
(3) Epiglottis and corniculate  
(4) Thyroid and cricoid

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141. Consider the following statements and choose the correct option from the choices that follow.

- A. Trachea extends upto mid thoracic cavity and divides at the level of 5<sup>th</sup> thoracic vertebra into two primary bronchi.
- B. The trachea, primary, secondary and tertiary bronchi and initial bronchioles are supported by incomplete cartilaginous rings.

- (1) Only A is correct  
 (2) Only B is correct  
 (3) Both A & B are correct  
 (4) Both A & B are incorrect

142. Four different sets of muscles are given in the options. Select the option from which neither muscle of the set is undergoing contraction when a person is performing abdominal breathing only.

- (1) Diaphragm and external intercostal muscles  
 (2) Diaphragm and internal intercostal muscles  
 (3) Abdominal and internal intercostal muscles  
 (4) Diaphragm and abdominal muscles

143. Select the incorrect match w.r.t. the pulmonary volumes and capacities.

- (1) Alveolar ventilation rate = [Tidal volume] × [Breathing rate]  
 (2) Vital capacity = [Total lung capacity] – [Residual volume]  
 (3) Total lung capacity = [Inspiratory capacity] + [Functional residual capacity]  
 (4) Residual volume = [Functional residual capacity] – [Expiratory reserve volume]

144. Select the statement which correctly describes the partial pressures of gases in inhaled and exhaled air.

- (1) The  $pO_2$  in alveolar air is lower than  $pO_2$  in venous blood  
 (2) The  $pO_2$  in exhaled air is greater than  $pO_2$  in alveolar air

(3) The  $pCO_2$  in exhaled air is greater than  $pCO_2$  in alveolar air

(4) The  $pO_2$  in arterial blood is greater than  $pO_2$  in alveolar air

145. The diffusion of  $O_2$  into blood at the surface of alveoli results in all the following consequences, except

- (1) Dissociation of  $CO_2$  from haemoglobin  
 (2) Dissociation of haemoglobin acid  
 (3) Reverse chloride shift  
 (4)  $HCO_3^-$  leaves the RBCs in the exchange of  $Cl^-$

146. The amount of oxygen transported by a litre of oxygenated blood to tissues of a person undergoing rigorous exercise will be

- (1) 15 mL  
 (2) 5 mL  
 (3) 150 mL  
 (4) 200 mL

147. The maximum amount of  $CO_2$  is transported through blood in

- (1) Dissolved form in plasma  
 (2) In the form of  $HCO_3^-$  ions in plasma  
 (3) In the form of carbamino haemoglobin in RBCs  
 (4) In the form of carboxy haemoglobin in RBCs

148. A sigmoid curve is obtained when percentage saturation of haemoglobin with  $O_2$  is plotted against the  $pO_2$ . Which of the following is not correct in context to dissociation curve?

- (1) High blood alkalinity causes left shift in the curve  
 (2)  $P_{50}$  value of adult haemoglobin is not affected by diphosphoglycerate  
 (3) Association of haemoglobin with oxygen becomes easier at lower temperature  
 (4)  $P_{50}$  value of adult haemoglobin is affected by increase  $pCO_2$ , temperature and acidity of the blood

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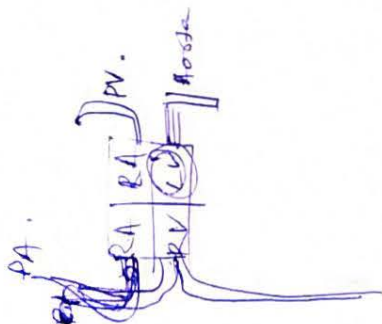
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149. Forced deep breathing during rest for some time as in hyperventilation is followed by temporary stoppage of breathing for some time, because of
- (1) Less carbon dioxide in blood
  - (2) High carbon dioxide content in the blood
  - (3) High oxygen content in the blood
  - (4) Less oxygen content in the blood
150. Which of the following is an occupational hazard affecting coal mine workers?
- (1) Bysinosis
  - (2) Asbestosis
  - (3) Pneumoconiosis
  - (4) Siderosis
151. The fluid which oozes out of a blood clot through the network of fibrin protein and it does not clot, is
- (1) Blood
  - (2) Lymph
  - (3) Serum
  - (4) Both (2) & (3)
152. Lack of blood clotting can be due to all the following reasons, **except**
- (1) Lack of clotting factor IV
  - (2) Lack of formation of thrombokinase
  - (3) Thrombopoiesis / Megakaryocytopoiesis
  - (4) Lack of synthesis of prothrombin plasma protein
153. Polymorphonuclear leucocytes are types of
- (1) Granular leucocytes
  - (2) Agranular leucocytes
  - (3) Lymphocytes
  - (4) Bone marrow stem cells which produce WBCs
154. Select the **Incorrect** statement w.r.t. heart coverings and its wall.
- (1) The fibrous and serous pericardium coverings are separated by a pericardial cavity
  - (2) Pericardial cavity is filled with pericardial fluid secreted by the visceral pericardium surrounding the heart
  - (3) Myocardium part of heart wall does not have a uniform thickness across all heart chambers
  - (4) Entire myocardium of ventricles contracts as a single unit due to presence of communication junctions between cardiac fibres
155. Ligamentum arteriosum connecting the pulmonary trunk and the aorta of an adult human heart is a remnant of embryonic \_\_\_\_\_, which allowed the blood to bypass the pulmonary circulation.
- (1) Fossa ovalis
  - (2) Foramen ovale
  - (3) Ductus arteriosus
  - (4) Sinus venosus
156. "Thickest musculature is present in the wall of left ventricle of the heart."
- Which of the following options cannot be considered as a consequence of the above observation?
- (1) The blood pressure in aorta will be higher than the blood pressure in pulmonary trunk
  - (2) The cardiac output from left ventricle will be higher than cardiac output from right ventricle as force of contraction of muscles is more
  - (3) Left ventricle will be able to pump the blood effectively into the extensive capillary networks across the body
  - (4) Force of contraction of left ventricle will be higher than force of contraction of right ventricle
157. The basilar valve prevents the backflow of blood from
- (1) Right auricle into pre-caval
  - (2) Right auricle into post-caval
  - (3) Right atrium into coronary sinus
  - (4) Right ventricle into right atrium

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158. Damage to chordae tendinae of mitral valves will result in all of the following, **except**
- (1) Reduction in stroke volume of left ventricle
  - (2) Backflow of the blood into left atrium
  - (3) Increase in the venous return to the left ventricle via the left atrium
  - (4) Reduction in cardiac output
159. The period of isovolumetric relaxation of ventricles is immediately followed by
- (1) The first rapid filling of ventricles
  - (2) Diastasis or slow filling of ventricles
  - (3) Ventricular systole
  - (4) Stroke period of contraction of ventricles
160. What is the time duration between the closure of semilunar valves and the closure of tricuspid and bicuspid valves?
- (1) 0.3 seconds
  - (2) 0.5 seconds
  - (3) 0.4 seconds
  - (4) 0.7 seconds
161. A. Increased venous return to the right atria increases the end diastolic volume which stretches or lengthens the ventricular muscle fibres.  
B. Frank-Starling relationship describes increase in cardiac output that occurs in response to increase in venous return.
- Select the **correct** option w.r.t. the above statements.
- (1) Only A is correct
  - (2) Only B is correct
  - (3) Both A & B are correct
  - (4) Both A & B are incorrect
162. Increase in the duration of time taken by the impulse to travel through atria, AV node and rest of the conducting system will be reflected in ECG as
- (1) Enlarged P-wave
  - (2) P-Q Interval lengthens
  - (3) Elongated S-T interval
  - (4) Depressed S-T line and flat T-wave
163. The layer of wall of blood vessels which can be used to differentiate between an artery and a vein, in addition to the difference in their lumen and width, is
- (1) Tunica externa
  - (2) Tunica media
  - (3) Tunica intima
  - (4) Tunica adventitia
164. Which of the following is a unique vascular connection which carries the blood from intestine to liver before it is delivered into the systemic circulation?
- (1) Renal portal system
  - (2) Hepatic portal system
  - (3) Special coronary circulation
  - (4) Lymphatic circulation
165. Inability of the heart to pump the blood effectively enough to sustain the body metabolism is a condition known as
- (1) Heart failure
  - (2) Myocardial infarction
  - (3) Heart block
  - (4) Cardiac arrest
166. The brush border absorptive columnar cells of the intestine are parts of its \_\_\_\_\_ layer.
- (1) Mucosa
  - (2) Submucosa
  - (3) Muscularis
  - (4) Serosa

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167. The roof of oral cavity, called as the palate, terminates at its soft part as a small overhang called A which B. Select the correct option w.r.t. the blanks A and B.
- (1) Uvula, prevents the food from going out of oral cavity
  - (2) Uvula, prevents the food from rising up into the nasopharynx
  - (3) Adenoid, prevents the food from rising up into the nasopharynx
  - (4) Uvula, ensures proper mixing of food with saliva
168. Which of the following teeth in human beings are considered as monophyodont?
- (1) All premolars
  - (2) Last / 3<sup>rd</sup> molars
  - (3) All molars and premolars
  - (4) Both (1) & (2)
169. GALT is the secondary lymphoid tissue of the alimentary canal. It is present in which of the following layers of intestinal wall?
- (1) Muscularis mucosa
  - (2) Lamina propria
  - (3) Muscularis externa
  - (4) Adventitia
170. The type of papillae on a human tongue which do not have taste buds and only serve to increase the friction between the tongue and the food for proper chewing are
- (1) Circumvallate papillae
  - (2) Filiform papillae
  - (3) Fungiform papillae
  - (4) Vallate papillae
171. The antibacterial components of human saliva which prevent decay of enamel of tooth by bacteria are
- (1) Amylase and lingual lipase
  - (2) Ptyalin and  $\text{Cl}^-$  ions
  - (3) Lysozyme and thiocyanate ions
  - (4) Lysozyme and ptyalin
172. Heart burn, which can be induced by over eating, anxiety, spicy food intake etc., involves
- (1) Gastroesophageal reflux of acidic contents of stomach
  - (2) Lack of closure of lower oesophageal sphincter at the time of beginning of gastric peristalsis
  - (3) Burning of wall of oesophagus due to the entry of acidic chyme
  - (4) All of these
173. All the following factors stimulate the release of gastric juice, **except**
- (1) Gastrin
  - (2) Vagus nerve activity
  - (3) Peptides and proteins in the stomach
  - (4) Enterogastrone
174. The thick muscularis externa with an extra oblique muscle layer is a feature of which organ of the digestive tract?
- (1) Oesophagus
  - (2) Stomach
  - (3) Ileum
  - (4) Colon
175. The common bile duct and the pancreatic duct open together into the A as the common hepatopancreatic duct which is guarded by a sphincter called as sphincter of B.
- Choose the option which correctly fills in the blanks A and B, respectively.
- (1) Duodenum; Boyden
  - (2) Ileum; Oddi
  - (3) Duodenum; Oddi
  - (4) Ileum; Boyden

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176. The portal triads present in the edges of hexagonal hepatic lobules include all, **except**

- (1) Branch of hepatic artery
- (2) Branch of hepatic portal vein
- (3) Branch of hepatic vein
- (4) Small bile ductules

177. After digestion, the breakdown products of lipids are first incorporated into droplets A, which move into the intestinal mucosa, reconstituted into B and finally transported into C of the villi of small intestine. The option which fills in all the three blanks correctly is

- (1) A – Chylomicrons, B – Micelles, C – Lacteals
- (2) A – Micelles, B – Chylomicrons, C – Lacteals
- (3) A – Fats, B – Fatty acids, C – Lacteals
- (4) A – Micelles, B – Chylomicrons, C – Blood capillaries

178. Most potent pancreatic protease, trypsin, which is autocatalytic and also activates other inactive proteases, is itself activated by

- (1) Enterogastrone of duodenum
- (2) Enterokinase of intestinal brush border cells
- (3) Enterocrinin of ileum
- (4) Pepsin from the gastric glands ✓

179. Haemorrhoids can be caused by

- (1) Varicosity of rectal veins due to prolonged constipation
- (2) Lack of fibres in the food
- (3) Dry and hard faeces which are difficult to pass out and accumulate in rectum and constant pressure damages the wall of rectal veins
- (4) All of these

180. *Taenia coli* and epiploic appendages are parts of the structure of

- (1) Large intestine ✓
- (2) Small intestine ✓
- (3) Appendix
- (4) Hepatic lobes

□ □ □

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